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Articles:

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Comparison of the sealing capacity of three endodontic filling techniques

Goldberg F, Massone EJ, Artaza LP. Comparison of the sealing capacity of three endodontic filling techniques. J. Endodon 1995; 21: 1-3.

PURPOSE: To compare the sealing ability of Trifecta, lateral condensation technique, and a combination of SuccessFil and lateral condensation.

M&M: Forty-seven upper central incisors were instrumented to a #45 apical file 1 mm short of the apex. Tubli-Seal sealer was applied with a #45 file to the canal walls and the teeth were filled using three different techniques: Group A was filled using Trifecta. The tip of a #40 file was coated with SuccessFil and placed into the canal. The file twisted counterclockwise to place the gutta-percha apically, and the gutta-percha was then condensed vertically with pluggers. The remainder of the canal was filled with Ultrafil. Group B was filled using lateral condensation. Group C was filled using a combination of SuccessFil, which was placed apically on the tip of a #40 file followed by lateral condensation of accessory cones. Teeth were radiographed then stored for 7 days at 100% humidity then immersed in India ink to determine leakage.

RESULTS: The Trifecta group showed radiographic defects including voids, but the lateral condensation and combination groups showed well adapted fills. There was no significant differences in dye leakage between the groups.

January 1995 **Martin Gambill**

Effects of a carbon dioxide laser on human root dentin

Read RP, Baumgartner JC, Clark SM. Effects of a carbon dioxide laser on human root dentin. J Endodon 1995;21:4-8.

PURPOSE: To examine the physical changes produced with various modes and watt settings of the Luxar LX-20 CO2 dental laser on cross-sections of resected apical root dentin using the scanning electron microscope and stereomicroscope.

M&M: Two mm thick cross-sections from the apical third of extracted human incisors were used. A smear layer was created and each specimen was lased in a pool of isotonic saline, but not submerged. Specimens were lased at watt settings from 2 to 15 W with different durations at a distance of 3 mm. Also, a prototype-curved tip for the laser was evaluated and compared to the conventional tip. Specimens were examined with a stereomicroscope and a SEM.

RESULTS: The effect of the laser energy on the resected apical dentin ranged from no visible effect at low energy, to charring, cracking, and "glazing" of the dentin at higher energy. Cracks were apparent not only where there was a cratering effect from higher energy hits, but also in lower energy lases. The curved prototype tip did not deliver as much energy to the dentin as the conventional tip. The pattern of the effect on dentin was irregular, with the curved tip as opposed to a more consistent round pattern with the conventional tip.

C&C: The use of CO2 laser energy on resected apical root dentin will not result in a less permeable root surface. It may create fissures large enough to hold significant numbers of bacteria of tissue breakdown products that could cause inflammation in the adjacent tissue.

January 1995 **Bruce Poulsen**

Microleakage through dentin after crown cementation

White SN, Furuichi R, Kyomen SM. Microleakage through dentin after crown cementation. J. Endodon 1995; 21: 9-12.

PURPOSE: To determine the influence of the crown luting cement material class on stain percolation through dentinal tubules toward the pulp.

M&M: Thirty five premolars recently extracted for orthodontic reasons were prepared for crowns using a paralleling device. Base metal alloy (Rexillium) crowns were fabricated and then cemented on the teeth using the following cements: 1. Zinc phosphate (Fleck's), 2. Polycarboxylate (Durelon), 3. Glass ionomer (Ketac-cem), 4. Microfilled bis-GMA resin with an NPG-GMA and PMDM dentin bonding agent (Thin Film Cement and Tenure), and 5. Microfilled bis-glycidylmethacrylate/phosphate ester resin (GMA/PE) (Panavia). The teeth were stored at 100% humidity for 24 h then artificially aged by thermal cycling for 1500 cycles. Leakage into dentin and along the crown-tooth interface through the crown margins was determined by submersion in silver nitrate stain for 60 min then placement in developer. The teeth were sectioned to evaluate leakage.

RESULTS: The rank from best to worst (least leakage to most leakage) was GMA/NPG, Glass ionomer, GMA/PE, Polycarboxylate and Zinc phosphate. The GMA/NPG had significantly decreased leakage in comparison to all other groups.

C&C: All of the systems tested in this study except the GMA/NPG are acidic and may partly or completely remove the smear layer. The GMA/NPG system seals open tubules with plugs of surface active polymers and co-polymers of NPG-GMA and PMDM which may account for the decreased leakage seen with this cement. Less leakage into dentin tubules might mean less post-cementation hypersensitivity, and less chance for forcing bacteria through the tubules and into the pulp during cementation of crowns.

January 1995 **Martin Gambill**

Effect of Super-EBA as a root end filling on healing after replantation

Pitt Ford TR, Andreasen JO, Dorn SO, Kariyawasam SP. Effect of Super-EBA as a root end filling on healing after replantation. J Endodon 1995;21:13-5.

PURPOSE: To investigate the tissue response to root end filling of Super-EBA.

M&M: Mandibular first molars from 4 monkeys were used. Four teeth were extracted, the roots apices were resected flat and a 2 mm deep root end cavity was prepared with a bur. Infection was introduced into the root canal before the root end was filled with Super-EBA cement. The molars were replanted. The monkeys were killed after 8 weeks, the apical areas were sectioned and stained. Sections were evaluated for inflammation, root resorption, and ankylosis.

RESULTS: All the roots filled with Super-EBA cement had inflammation in the none/few inflammatory cell category. The differences between IRM (previously reported) and Super-EBA were small and not significant. No root end was covered by cementum.

C&C: Super-EBA cement seemed to provide an effective seal of the root end because inflammation was absent or mild. The tissue response to Super-EBA cement after 2 months was good and significantly less severe, and less extensive than that of amalgam (previously reported).

January 1995 **Bruce Poulsen**

Effects of antibacterial capping agents on dental pulps of monkeys mechanically exposed to oral microflora

Yoshiba K, Yoshiba N, Iwaku M. Effects of antibacterial capping agents on dental pulps of monkeys mechanically exposed to oral microflora. J. Endodon 1995; 21: 16-20.

PURPOSE: To histologically evaluate whether the addition of these mixed drugs to -Tricalcium phosphate (-TCP) material would be effective in the healing of pulp mechanically exposed to oral microflora.

M&M: Forty anterior and premolar teeth in 2 adult monkeys were used. In 19 teeth buccal class V cavities were prepared and the pulp was exposed. Hemorrhage was controlled with cotton pellets and the pulp was capped in Group I with -TCP mixed with 3% metronidazole + 1% ciprofloxacin + 1% minocycline, in Group II with -TCP mixed with 3% metronidazole + 1% ciprofloxacin + 1% cefaclor, and in Group III (control) with either -TCP or Ca(OH)2. The preparations were filled with polycarboxylate cement and then covered with composite resin. An additional 19 teeth were prepared as above except the pulp was left open to the oral environment for 24 h to test the effect of the drugs on bacterially contaminated pulp tissue. The monkeys were killed 4 weeks postoperatively and the pulps were evaluated for inflammation, hard tissue formation, and bacteria.

RESULTS: In the non-contaminated pulps capped with either -TCP or Ca(OH)2 tended to show hard tissue formation below the capping material. However the 2 groups capped with -TCP mixed with either of the medicaments showed no hard tissue barrier formation and varying degrees of inflammation. In the contaminated teeth capped with -TCP all pulps were necrotic. The contaminated pulps capped with Ca(OH)2 were similar to the non-contaminated pulps with hard tissue barrier formation and little inflammation. The contaminated teeth capped with -TCP mixed with either of the 2 medicaments showed no hard tissue barrier formation and varying degrees of inflammation similar to the non-contaminated pulps. Ca(OH)2 produced a hard tissue barrier below the exposure site with no inflammation in both the non-contaminated and the contaminated groups.

C&C: The effectiveness of Ca(OH)2 in the presence of pulpal inflammation has been questioned in past studies, however it seemed to work whether the pulp was contaminated or not in this study. There appears to be no reason to add antibiotic agents to pulp capping materials at this time.

January 1995 **Martin Gambill**

Isolation of methicillin-resistant Staphylococci in the dental operatory

Horiba N, Yoshida T, Suzuki K, Maekawa Y, Ito M, Matsumoto T, Nakamura H. Isolation of methicillin-resistant Staphylococci in the dental operatory. J Endodon 1995;21:21-5.

PURPOSE: To assess the state of contamination of the dental operatory by methicillin-resistant Staphylococci and to investigate the possibility of nosocomial infection by those bacteria.

M&M: Samples were obtained from the nasal cavity of 28 dentists, 8 dental hygienists, 3 dental assistants and 17 students. Also, 12 dental chairs, 12 brackets, 8 cabinets, 16 floors, and the handle of four doors were sampled. Airborne methicillin-resistant Staphylococci at six places were examined. The samples were cultured and antibiotic sensitivity was identified.

RESULTS: Methicillin-resistant Staphylococci were detected in 8 (20.5%) of the dental staff and 2 (11.8%) of the dental students. Methicillin-resistant Staphylococcus aureus was not detected. The predominate methicillin-resistant species detected was Staphylococcus epidermidis (80%). Methicillin-resistant species were found on 1 dental chair, 1 bracket, 1 cabinet, 6 floors, and in 1 airborne sample. Methicillin-resistant Staphylococcus aureus was not detected. A positive relation was found between a strain detected from a dental staff person and that found on a dental chair and another relation was found on one floor sample.

C&C: The possibility of nosocomial infection through the dental staff is suggested. So, infection control is important in the dental setting.

January 1995 **Bruce Poulsen**

A comparison of four instrumentation techniques on apical canal transportation

Luiten DJ, Morgan LA, Baumgartner CJ, Marshall GJ. A comparison of four instrumentation techniques on apical canal transportation. J. Endodon 1995; 21: 26-32.

PURPOSE: To compare the effects of the crown-down technique, the step-back technique, MM 1500 sonic instrumentation, and the NiTiMatic system on the amount of apical transportation in small curved canals.

M&M: Sixty mandibular molars with mesial root curvatures >25 were used. Distal roots were removed and a #10 file was placed in the MB canal to the apical foramen. Mercury was forced into the canal and radiographs were made of the teeth after they had been mounted in a jig which would allow accurate repositioning. The teeth were then divided into groups and instrumented using the following techniques: 1. Step-back, 2. Crown-down (Morgan and Montgomery technique), 3. Sonic instrumentation (MM 1500), and 4. NiTi instrumentation with the NiTiMatic system. All canals were enlarged to a #35 apical size except the NiTiMatic group which was enlarged to a size #40. After instrumentation, the canals were again filled with mercury and the original radiographs were double exposed which produced an image with the original and instrumented canals on the same film. The radiographs were scanned and stored on computer diskettes. Measurements of transportation and canal curvature were made using a computer imaging software program.

RESULTS: There was no significant difference between any of the four groups as to ledging, elbow formation, apical zipping, or canal transportation and any level. However, at the apex the step-back technique produced canals significantly wider in diameter than the canals in the NiTi group. The NiTi group produced less apical extrusion of debris. The NiTi instrumentation was also faster than the other instrumentation systems (4 min vs. 8 to 10 min).

C&C: The system used for measuring transportation may not be accurate enough to differentiate between the different instrumentation techniques used in this study.

January 1995 **Martin Gambill**

The mandibular incisor: rethinking guidelines for post and core design

Gluskin AH, Radke RA, Frost SL, Watanabe LG. The mandibular incisor: rethinking guidelines for post and core design. J Endodon 1995;21:33-7.

PURPOSE: To evaluate how the anatomical characteristics of lower incisors might influence restorative strategies in the selection of a post system.

M&M: Fifty extracted human mandibular incisors were used. Forty teeth were prepared and obturated with gutta-percha. A post space of 8 mm was created. Dowel types included a prefabricated round cross-sectional design (Parapost) and a morphologic dowel (cast gold) that reproduced the canal space morphology. The smear layer was removed from the post spaces and the posts were cemented with zinc phosphate cement. The dowel retention was tested in retention and transverse loading.

RESULTS: In the retention and tensile evaluations, the morphological post design demonstrated superior retention over the standardized post design. The serrated prefabricated post is more likely to fracture along its serrations and complicate post retrieval. A ferruled morphological post is less likely to result in a root or post fracture when the post was displaced.

C&C: When a minimum amount of coronal tooth structure exists, the mandibular incisor should be restored with a morphologically cast post and core. However, no post and core build-up design has ever been shown to be superior to the intact natural crown of an endodontically treated tooth.

January 1995 **Bruce Poulsen**

Canal configuration of the mesiobuccal root of the maxillary second molar

Eskoz N, Weine FS. Canal configuration of the mesiobuccal root of the maxillary second molar. J. Endodon 1995; 21: 38-42.

PURPOSE: To determine the canal configuration percentages in the MBR of the maxillary second molar using a clinically oriented in vitro study.

M&M: Seventy-three maxillary second molars were examined radiographically after placing instruments in the canals of the MB root to a size #15 file. Weine's classification system was used.

RESULTS: Of the 73 teeth 91.8% had three roots and 8.2% had two roots. In the mesial buccal root 59.7% had a single canal only, 20.9% had type II canal systems, 16.4% had type III configurations and 3% had a type IV system. Overall, 40% of the teeth had 2 canals in the mesial buccal root.

C&C: This study found a smaller percentage of canals in the mesial buccal root than a previous study by Peters who found 78.2% incidence of 2 canals in the mesial buccal root. This study suggests that a wide mesial buccal root does not necessarily mean that there are 2 canals present. Apparently single wide kidney shaped canal systems in the mesial buccal root may gradually calcify in the center to form 2 separate canals as the tooth ages.

January 1995 **Martin Gambill**

Surgical apical repair with Super-EBA cement: a one-visit alternative treatment to apexification

Wiscovitch JG, Wiscovitch GJ. Surgical apical repair with Super-EBA cement: a one-visit alternative treatment to apexification. J Endodon 1995;21:43-6.

PURPOSE: To present an alternative one-visit treatment to conventional apexification.

METHODOLOGY: Obturate the canal with thermoplastic gutta-percha. Once the canal space is obturated, surgical access to the apex is gained, and the apical overfill is removed. The apex is resected minimally until 1 mm of root dentin thickness is uniformly evident around the gutta-percha fill. The apical 2-3 mm of gutta-percha are removed and the cavity is filled with Super-EBA cement.

DISCUSSION: This mode of treatment should not be used in short-rooted teeth with extreme apical immaturity, young school children who are dentally underdeveloped, and medically compromised young adults or school children. However, it is an economic, one-appointment treatment alternative.

January 1995 **Bruce Poulsen**